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Fishery Leaflet 180

Washington 25, D. C. - 41500 - Revised July 1948

HOME CANNING OF FISH

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Contents

	Page		Page
General Directions	1	Whole Clams	6
Recommended Procedures	2	Minced Clams	7
Salmon and Shad	3	Oysters	7
Mackerel, Herring, Lake Trout, Whitefish, and Mullet or "Mooneye"	3	Crab (Atlantic and Gulf Coast)	8
		Dungeness or Pacific Crab	9
		Shrimp, Wet-pack Method	10
Mackerel in Tomato Sauce	4	Lobster	11
Recipe for Tomato Sauce	4	Fish Chowder	12
Tuna-style Pack	5	Clam Chowder	12
Fish Flakes	5	Related Publications	13

GENERAL DIRECTIONS

The home canning of fish should be considered only when a supply of suitable raw material may be obtained at low cost. Where fish is purchased for canning at average wholesale prices, the cost of the home canned fish is much higher than that of the commercially canned product. Only fresh fish should be canned and these should be bled and thoroughly cleaned of all viscera and membranes when caught, or as soon thereafter as practicable. Do not attempt to "save" a lot of fish from spoilage by canning some time after catching, as the canned product will be of inferior quality. Canning should be restricted to proven varieties where it is definitely known that a product of good quality may be obtained.

IN THE HOME CANNING OF FISHERY PRODUCTS ONLY A RELIABLE STEAM PRESSURE COOKER SHOULD BE USED FOR COOKING THE PRODUCT IN THE CONTAINERS. The hot water bath or oven "processing" (sterilization) methods are not safe and, therefore, cannot be recommended. It is recommended that the steam pressure cooker be equipped with an "industrial" type thermometer as well as a pressure gauge. This is needed as a check on the accuracy of the pressure gauge, and as a means of determining errors which may occur in the operation of the pressure cooker.

NO CONTAINER LARGER THAN A PINT JAR OR NUMBER 2 TIN CAN SHOULD BE USED IN THE HOME CANNING OF FISH. Difficulties in sterilization make the use of larger sized containers unsafe. A "plain" (unenameled) can may be used for salmon or shad, but in canning shellfish or shrimp a can lined with "C" enamel should be used to prevent discoloration.

When using No. 2 cans a cooking period of not less than 90 minutes at 10 pounds of pressure (240° F.) should be given for safe sterilization. For pint jars, the recommended cook is 100 minutes at 10 pounds of pressure (240° F.). Exceptions in the case of special products will be noted in the directions for packing that product.

In processing (sterilizing) in the pressure cooker, do not close the vent (petcock) until the steam is escaping in a steady stream with a hissing noise. At least seven minutes should be allowed from the time the vapor first escapes before closing the vent.

The pressure in the cooker should be released slowly after canning. This is especially important when canning in glass, since rapid reduction of pressure within the cooker will lead to a great deal of breakage. A period of 15 to 20 minutes should be allowed if glass containers are used and about 5 minutes for tin cans. When the jars or cans are removed from the cooker, stack them loosely, otherwise cooling will be delayed.

All containers should be inspected before canning, and only containers without defects should be used. Containers and contents should be examined before consumption of the product and if defects are noted or any product is of doubtful quality, it should be discarded.

RECOMMENDED PROCEDURES

The methods given herein are recommended only for the fish specifically named. However, the processes as given are adequate for the sterilization of practically all varieties of fishery products. Because of certain peculiar physical properties of some species of fish, certain of the processes might not produce an attractive product, or in some cases, the temperature of processing time would be so severe that quality would be affected. Therefore, if it is desired to can a fish not listed here it is suggested that the home canner experiment with more than one method selecting the one giving the best results. As an example, the first method would probably be best for firm fleshed fish resembling salmon or shad, while fish of rather soft texture, such as fresh-water fish, might be better adapted to the method used for mackerel.

The home canner should remember that this publication is intended only as a guide, not an infallible recipe, and that much depends on the care with which instructions are followed.

SALMON AND SHAD

1. Clean and wash the fish thoroughly, scraping off scales and slime, and removing all traces of blood or other waste material. The backbone should not be cut away. It contains valuable minerals and is made quite soft and edible by cooking in the pressure cooker.

2. Cut the cleaned fish in can-length pieces, then soak in a salt brine for sixty minutes. The brine is made by dissolving one-half pound of salt in a gallon of water. Do not use it more than once.

3. Drain the brined fish for several minutes, then fill into the containers. Pack the containers solidly until the fish is even with the rim. Do not crush or jame the fish into the container when packing.

4. (a) If the pint jars are used, seal and process in the pressure cooker for 100 minutes (1 hour and 40 minutes) at 10 pounds of pressure (240° F.).

(b) If the fish is packed in No. 2 cans, put on the lids loosely and steam in the cooker for fifteen minutes at 212° F., without fastening down the cover. Then remove the cans and seal immediately. Process for 90 minutes at 10 pounds of pressure (240° F.).

5. (a) Check the seals of the pint jars and cool in the air.

(b) Cool the No. 2 cans in running water. If this cannot be done, put them in a tub of water, changing the water as it becomes warm.

Twenty-five pounds of fish, round weight, will be required to fill a dozen No. 2 cans or pint jars.

MACKEREL, HERRING, LAKE TROUT, WHITEFISH, AND MULLET OR "MOONEYE"

1. Use only fresh fish. Clean the fish thoroughly, cutting away strips of the thin belly section between half and three-fourths of an inch in width. Wash the cleaned fish well in fresh water then drain for a few minutes.

2. Split the cleaned and washed fish, but do not attempt to cut out the backbone. Then cut the split fish in container length pieces and soak these in brine for sixty minutes. The brine is made by adding one cup of salt to one gallon of water.

3. Drain the brined fish, then fill into the containers, alternating head and tail ends in order to secure a good fill. The skin side of the fish should face the glass when packing in pint jars. Pack the fish in the containers even with the rim.

4. (a) If pint jars are used, submerge the open jars in a kettle containing brine made in the proportion of one-half cup of salt to a gallon of water. Bring this brine to a boil and allow to boil for twenty minutes.

(b) If the pack is made in No. 2 cans, they are submerged in boiling brine of the same strength and boiled for 20 minutes.

5. Remove the containers, whether cans or jars, and invert them on a wire screen to drain for about three minutes. The drained liquid is discarded. Add a bay leaf or two and a couple of slices of onion to each container. Seal immediately while hot.

6. (a) Process pint jars for 100 minutes at 10 pounds of pressure (240° F.).

(b) If the pack is made in tin, process it for 90 minutes at 10 pounds of pressure (240° F.).

7. (a) Check the seals of the jars and air cool.

(b) Cool the cans in water.

Twenty-six and one-half pounds of fish, round weight, will be required to fill a dozen No. 2 cans or pint jars.

MACKEREL IN TOMATO SAUCE*

Follow the method given above to, but not including, step No. 5, then proceed as follows:

5. Remove the containers and invert on a screen to drain for about three minutes, discarding the drained liquid.

6. (a) Fill pint jars with hot tomato sauce to within 1/4 inch of the rim. Seal immediately. Process for 100 minutes at 10 pounds of pressure (240° F.), releasing pressure slowly as instructed above.

(b) Fill No. 2 cans with hot tomato sauce. Seal immediately. Process for 90 minutes at 10 pounds of pressure (240° F.).

RECIPE FOR TOMATO SAUCE

1 gallon tomato puree	1/2 oz. ground horseradish
6 tablespoons spiced vinegar	2 tablespoons minced onion
1 oz. salt	

Mix the ingredients and concentrate by boiling to one-half the original volume.

Twenty-six and one-half pounds of fish, round weight, will be required to fill a dozen No. 2 cans or pint jars.

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* May also be used for such fish as herring and mullet.

TUNA-STYLE PACK

This method is best suited for albacore or white-meat tuna, tuna, king mackerel and mackerel. Only large mackerel should be used.

1. Clean the fish and wash them thoroughly. Cut away strips of the thin belly section between one-half and three-fourths inch in width.

2. Place the fish in pans with perforated bottoms and stack these in the pressure cooker. Bring pressure up to 10 pounds and cook for 2 hours.

3. The cooked fish must be cooled from 4 to 8 hours or the flesh will crumble and a good product will not be secured. When the fish is cool scrape away the skin with a knife, lift out the backbone and cut away the streaks of dark flesh along the sides. Cut the meat in sections about three-eighths inch shorter than the height of the containers.

4. Place one-half level teaspoon salt in each empty container, either half flat cans or half pint jars. Larger size containers are not recommended for this style pack. Fill the meat solidly into the containers using small flakes to fill the crevices. Fill up the containers with hot salad oil. Olive oil is preferable, but cottonseed, peanut or soya oil may be used.

5. Clinch the lids on loosely and steam for 10 minutes at 212° F. Then seal the cans immediately.

6. Process tin cans for 70 minutes and half-pint jars 80 minutes at 15 pounds pressure (250° F.).

To fill 12 half-flat cans or half pint jars, 25 to 26 pounds of albacore, tuna or mackerel will be required.

FISH FLAKES

This method gives the best results when canning cod or similar bottom fish, or fish like hardheads (croakers) with deep short bodies. It is difficult to obtain a good fill with these fish if an attempt is made to can the whole bodies or large pieces.

1. Clean and wash the fish thoroughly, removing all traces of blood or other waste material.

2. Soak in a salt brine for 60 minutes. The brine is made in the proportions of one-half pound of salt to a gallon of water. Rinse the fish and drain for 10 minutes.

3. Arrange the fish in pressure cooker pans with perforated bottoms, and steam for 30 minutes at 10 pounds pressure (240° F.).

4. As soon as the cooked fish can be handled, separate the flakes of meat from the skin and bones. Discard any stray bits of coagulated blood or viscera and any dark or discolored pieces of flesh.

5. Fill into containers, packing the flesh down so that there are no air holes. Two cups of flakes are needed to fill either No. 2 cans or pint jars.

6. (a) Exhaust No. 2 cans for 10 minutes at 212° F. and seal.

(b) Pint jars are sealed immediately on filling.

7. Process No. 2 cans for 90 minutes at 240° F. and pint jars 100 minutes at the same temperature and pressure.

8. Cool cans in water. Check seals of jars and air cool these containers. Sixteen pounds of fish (round weight) yield an average of four pounds of flakes.

WHOLE CLAMS

This method is recommended only for the quahogs or hard clams of the Atlantic Coast, and butter, littleneck, razor and hard clams of the Pacific Coast.

1. The clams should be scrubbed and placed in a tub of clean salt water. As there is some danger that ocean water may be contaminated, it is always better to make a 10 percent brine by dissolving salt in fresh drinking water. Scatter a few handfuls of corn meal in the brine and allow the clams to remain in it from 12 to 24 hours.

2. There are two methods of opening clams. The product obtained by the first method is more attractive, but less time is required by the second method; (1) Open the live clams over a pan and save the juice, then open the body and scrape out the dark mass. Theoretically, this dark mass contains material of food value but its inclusion is likely to lead to discoloration and "off" flavors in the canned product. In case of little-neck clams, the dark siphon, or "neck", should be snipped off; (2) put the clams into a steamer with a drip pan below to catch the juice and steam them for 20 minutes, then split open, clean, and snip off the siphons.

3. Wash the meats thoroughly in a brine made up in the proportion of 1/4 cup salt to 1 gallon of water.

4. Blanch the clam meats for 1 minute in boiling water containing 1/2 teaspoon citric acid crystals or 3 teaspoons lemon juice to 1 gallon water.

5. Pack 1-3/4 cups clam meats to each No. 2 can or pint jar. Concentrate the juice saved from shucking or steaming to about two-thirds of the original volume by boiling, and strain.

6. Fill the containers to within one-fourth inch of the top with the hot concentrated clam juice, and seal containers immediately.

7. Process: No. 2 cans 60 minutes; pint jars 70 minutes at 10 pounds pressure (240° F.).

To fill 12 No. 2 cans or pint jars, 3 gallons of shucked meats are required.

MINCED CLAMS

Quahogs, Butter, Littleneck, or Razor Clams

Follow steps 1 to 4, inclusive, described in the canning of whole clams.

5. Grind the blanched and drained meats with a grinder, using a plate with one-eighth inch holes.

6. If scales are available fill containers by weight as follows: 6 ounces of ground meats into No. 1/2 flat or No. 1 cans, or half-pint jars, and twelve ounces into No. 2 cans or pint jars. If scales are not available fill 3/4 cup of ground meats into half-pint and 1½ cups into pint containers. Fill containers with hot concentrated clam juice, stirring until the meats are well mixed. Seal tin cans immediately.

7. Process half-flat or No. 1 cans 60 minutes, and No. 2 cans 80 minutes at 8 pounds pressure (236° F.); half-pint jars 70 minutes and pint jars 90 minutes at 8 pounds pressure (236° F.).

To fill 12 No. 1 or half-flat cans or half-pint jars 3 gallons of shucked meats are required.

OYSTERS

1. Wash the oysters carefully in a weak brine solution (¼ cup salt to 1 gallon water).

2. Place the unshucked oysters in metal baskets or pans and steam them in a pressure cooker for 5 minutes at 10 pounds pressure (240° F.). An alternate method is to steam in an ordinary cooker at atmospheric pressure (212° F.) for 10 to 15 minutes.

3. Shuck the oysters immediately after steaming in the same manner as fresh oysters. The meats should be shucked into a weak brine solution because the protective mucous coating of the oyster meat is destroyed in steaming and the meats oxidize rapidly if exposed to air.

4. Wash the shucked meats in weak brine of at least three times the volume of the meats until all sand or grit particles sink to the bottom.

5. Drain the washed oyster meats for 5 minutes and fill into the containers. Filling should be by weight as follows: 8 ounces in No. 1 picnic (Eastern oyster) cans or half-pint jars, 12 ounces in No. 1 tall cans, and 16 ounces in No. 2 cans or pint jars. If scales are not available fill 1 cup, 1½ cups and 2 cups, respectively. A small amount of weak salt brine (¼ cup salt to 1 gallon water) should be added to each container.

6. If the pack is made in glass, the containers are sealed without exhaust. Clinch the covers of tin cans lightly and exhaust for 5 minutes at 212° F., after which sealing is completed.

7. Process No. 1 picnic cans 29 minutes; half-pint glass jars and No. 1 tall cans 35 minutes; No. 2 cans 42 minutes, and pint glass jars 50 minutes at 10 pounds pressure (240° F.).

The quantity of oysters required for 12 No. 2 cans or pint glass jars will vary with the locality and time of year. In Maryland and Virginia 3 bushels of unshucked oysters is the average requirement. Olympic oysters (native oysters of the Pacific Coast) are not usually considered large enough for canning.

CRAB (ATLANTIC AND GULF COAST)

Only large size crabs should be used and they must be alive at the beginning of the canning operation. Leather gloves or tongs may be needed for handling the crabs, although dipping in ice water makes them sluggish so that there is little danger from pinching. The blood of the crab contains compounds causing discoloration. If the whole crabs are cooked before shelling and cleaning these compounds are fixed in the flesh, later discoloring it when processed. Unless crabs are shelled, cleaned and washed before cooking it is impossible to control discoloration.

1. Dip the crabs in ice water for 1 or 2 minutes, then grasp the body between the back legs and break off the claws and legs. Claws are saved but legs are discarded as waste. To remove the back shell, insert the fingers in the leg holes and pull the shell apart.

2. Remove the gills or "fingers", crab butter, and other viscera and wash the bodies in a heavy spray of fresh water. The crabs may be washed in tubs if running water is not available, using a vegetable brush to scrub them. The water must be changed frequently and the crabs thoroughly rinsed after washing.

3. Pile bodies and claws in wire-mesh baskets or perforated containers that will fit in the pressure canner and steam them for 10 minutes at 8 pounds pressure (236° F.).

4. Pick the meat as soon as possible after steaming, keeping claw and body meat separate. The picker must be careful that bits of shell are not included in the meat, because shell is not softened by processing and it must be removed before the meat is canned.

5. Wash the meat in a brine made in the proportion of one-half cup of salt to 2 quarts of water. Drain the meat for a few minutes, then dip it into a brine composed of one of the following solutions: (1) one-fourth cup of lemon juice in 2 quarts of water; (2) one level teaspoon of citric acid powder dissolved in 1 quart of water; or (3) one-half cup of vinegar to 2 quarts of water.

6. Press the meat with the hands until all excess moisture from washing and brining is removed.

7. Fill the meat into half-pound flat or No. 1 standard (Eastern oyster) cans "C" enamel, and lined with vegetable parchment paper, or half-pint glass jars. The use of containers of larger size is not recommended. Put from three-fourths to seven-eighths cup of meat into each can or jar. If scales are available, fill 6 to 6½ ounces by weight. Pour enough brine, made in the proportion of 1½ tablespoons of salt to 1 quart of water into each container to cover the meat.

8. Exhaust tin cans 10 minutes at 212° F., then seal. Crab packed in glass is not exhausted, but is sealed and processed immediately after the brine is added.

Process: Half-pound flat or No. 1 Eastern oyster cans 80 minutes and half-pint jars 90 minutes at 5 pounds pressure (228° F.).

Body and claw meat are canned separately as the claw meat is coarser in texture and darker in color. Many people prefer the claw meat to the body meat on account of its stronger flavor, and for this reason it is suggested for use in crab gumbo, deviled crab and crab soup.

If the crabs are of average size 24 pounds (weight as caught) are required for 12 No. 1 cans or half-pint jars.

DUNGENESS OR PACIFIC CRAB

The method of canning Dungeness or Pacific crab, with few exceptions, closely follows that for Atlantic or Gulf crab. The legs are not discarded, however, since they contain a good deal of high quality meat.

In precooking, prior to picking, the legs and bodies of Dungeness crab may be steamed as described under Atlantic crab or be cooked in boiling water to which vinegar and salt are added in the proportion of 1/4 cup vinegar and 1 cup of salt to each gallon of water. A few whole black peppers and bay leaves may be added to the cooking water also.

In packing the containers place layers of leg or claw meat on top and bottom with body meat in the center.

SHRIMP, WET-PACK METHOD

This product should be packed only near the place where the shrimp are taken, as they spoil quite readily.

1. If the shrimp are taken by the canner's family, the shrimp should be headed as soon as removed from the water. If this is done, the black streak along the back, the so-called "sand-vein", can be removed with the head. After the shrimp are out of the water 30 minutes or more the black streak cannot be removed in this manner. If the shrimp are bought from a fisherman he may be persuaded to head them when caught, if arrangements are made in advance and the catch is fairly light. No practice can do more toward improving the quality of canned shrimp.

2. The shrimp should be packed in finely crushed ice as they are headed. This not only retards spoilage but it has been found that the shells can be more easily removed after the shrimp have been in ice for some time.

3. Wash the shrimp thoroughly picking out all foreign matter. Stale shrimp, recognized by their dead flat color and strong ammonical odor, must be discarded.

4. Peel the shrimp and wash the meats in fresh water.

5. Place not more than 35 pounds of the meats in a galvanized metal container and cover them with cold brine, made up in the proportion of one-half cup of salt to 1 quart of water, for from 20 to 30 minutes, depending upon their size. Stir the shrimp occasionally so that brining will be uniform.

6. Drain the meats and place them in wire baskets of the type used for deep-fat frying. The basket should be not more than half full. Fill a large preserving kettle with brine made in the proportions above. Bring the brine to a boil and lower the shrimp into it. Cook for 6 to 8 minutes, counting the time from when the brine again begins to boil. Salt should be added in the proportion of 1 tablespoon to a quart after each batch. Discard the brine, and use an entirely fresh brine after 4 or 5 batches.

7. Spread the blanched shrimp on a wire-mesh screen, tray or rack to dry and cool. An electric fan will shorten the time required. Bits of shell missed in peeling and washing may be removed at this time. The meats must be cool and show no traces of surface moisture before filling into the containers.

8. Fill the meats into the containers by weight, 6 ounces (3/4 cup) into a No. 1 can or half-pint jar, and 12 ounces (1½ cups) into a No. 2 can or pint jar. Fill the containers with scalding brine, made in the proportions of 1½ tablespoons of salt to 1 quart of water and seal immediately. Cans should be of the "C" enamel type, seafood formula, although plain cans are suitable if lined with vegetable parchment paper.

9. Process immediately: No. 1 cans 20 minutes at 10 pounds pressure (240° F.) or 10 minutes at 15 pounds pressure (250° F.); No. 2 cans 30 minutes at 10 pounds pressure or 15 minutes at 15 pounds pressure; half-pint jars 25 minutes at 10 pounds pressure or 13 minutes at 15 pounds pressure.

To fill 12 No. 2 cans or pint jars 18½ pounds of "green" headless shrimp are required.

LOBSTER

1. Place the live lobsters in boiling water that contains 2 tablespoons of salt to each gallon. Boiling will momentarily cease, but upon resumption the lobsters should be cooked for from 15 to 30 minutes, depending upon their size.

2. Remove the lobsters from the boiling water and immediately chill them in cold water that contains 1 tablespoon of salt per gallon. Do not use sea water for cooling purposes. After the lobsters are cool, pick out the meat in as large pieces as possible.

3. Wash the meat quickly but thoroughly in running water, and pick out any shell fragments that remain. Then drain the meat for from 5 to 10 minutes to remove as much excess water as possible.

4. After draining, dip the meat in a solution made up of one of the three following: (1) One-fourth cup lemon juice in 2 quarts of water; (2) 2 level teaspoons of citric acid powder in 2 quarts of water; or (3) one-half cup vinegar in 2 quarts of water.

5. Press the meat lightly with the hands to remove excess moisture from the washing and brining and fill into No. 1 standard (Eastern oyster) cans, "C" enamel, lined with vegetable parchment paper. Half-pint glass jars may be substituted for the cans. Owing to difficulty in processing, larger containers are not recommended. Pack 6 ounces (three-fourths cup) in the cans or jars as follows: Place tail meat on the bottom, small pices of arm meat in the center, and claw meat on top, dark side up, alternating ends to secure a good fill.

6. Fill the containers to the top with hot brine made up in the proportion of 3 tablespoons of salt to each gallon, clinch the lids loosely, exhaust for 10 minutes, and complete the seal. Do not exhaust glass jars, but seal them immediately after the hot brine is added.

Process: No. 1 (Eastern oyster) cans 60 minutes at 10 pounds pressure (240° F.), or 80 minutes at 5 pounds pressure (228° F.). Half-pint glass jars 70 minutes at 10 pounds pressure (240° F.), or 90 minutes at 5 pounds (228° F.).

FISH CHOWDER

Flesh from backbones, heads or other portions of fish may be utilized. The amounts in the formula given here are sufficient for one dozen No. 2 cans or pint jars.

5 lb. diced potato	2 qts. fish broth*
5 lb. fish, boned (edible portion)	2 tbs. salt
3/4 lb. salt pork (fat back) diced	1/2 tsp. pepper
3/4 lb. chopped onion	1/2 cup flour

*Fish broth is obtained by cooking edible scraps of fish in water in the proportion of about 4 lb. of scraps to 1 gallon of water. Backbones and heads or other portions of fish may be utilized. The mixture is allowed to simmer for 2 hours, after which it is strained and the scraps discarded.

1. Grind the pork and onions, then cook them together in a preserving kettle until they are soft, but not brown.

2. Beat the flour slowly into the fish broth until a smooth milky liquid is obtained. Add this to the kettle together with the salt and pepper, and simmer contents to boiling point.

3. Fill three-fourths cup of diced potato and three-fourths cup of fish into each No. 2 can or pint jar. To prevent discoloration, potatoes should be blanched immediately after dicing or kept in water until needed. Some canners find it better to steam the fish in a pressure cooker and then flake it than to use raw fish.

4. After adding the fish and potatoes fill each container with hot fish broth and seal immediately.

5. Process No. 2 cans 80 minutes and pint jars 90 minutes at 10 pounds pressure (240° F.).

This is a concentrated chowder. Dilute with an equal quantity of milk when heating for serving.

CLAM CHOWDER

The above recipe for fish chowder may be used for New England clam chowder by substituting 9 cups of clams for the fish. To make Manhattan chowder 3/4 cup of diced celery and 2 pints of canned tomato should be added to the broth.

RELATED PUBLICATIONS

HEERDT, MARTIN, JR.; BUCHER, DORRIS L.; and STANSBY, MAURICE E.

1945. Refrigerated locker storage of fish for home use. Fishery Leaflet 128, Fish and Wildlife Service.

JARVIS, NORMAN D.

1945. Home preservation of fishery products - salting, smoking, and other methods of curing fish at home. Fishery Leaflet 18, Fish and Wildlife Service.

JARVIS, NORMAN D.; and PUNCOCHAR, JOSEPH F.

1946. Home canning of fishery products. Conservation Bulletin No. 28. (This bulletin contains additional general information on canning and methods for other products. It may be purchased from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., price 10 cents).

KERR, ROSE G.

1947. Basic recipes for cooking fish. Fishery Leaflet 106, Fish and Wildlife Service.

OSTERHAUG, KATHRYN L.; and BUCHER, DORRIS L.

1945. Precooked frozen fish preparations. Fishery Leaflet 144, Fish and Wildlife Service.

NOTE: The above Fishery Leaflets may be obtained, free of charge, from the Fish and Wildlife Service, U. S. Department of the Interior, Washington 25, D.C.

Issued: March 1946

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